H1-4.1.9 CPP-67

Service Waste Percolation Pond No. 1 (SWP-1)

SWP-1 is located outside the south ICPP security fence, southeast of ICPP, and was established in 1984. The pond is approximately 125.0 m (410 ft) long in the east-west direction and 146.3 m (480 ft) in the north-south direction and approximately 5.5 m (18 ft) deep. The pond was excavated in gravelly alluvium that is approximately 7.6 to 9.1 m (25 to 30 ft) thick and is underlain by basalt. Additional details regarding site background, operational history, physical setting, and extent of previous investigations may be found in *the Draft Work Plan for Idaho Chemical Processing Plant Percolation Pond Investigation* (Ebasco 1991).

In 1984, a total of 1,794 M L (474 M gal) of wastewater was discharged to SWP-1. A total of 1,476 M L (390 M gal) of wastewater was discharged to SWP-1 between January 1 and October 16, 1985. On October 17, 1985, the wastewater was diverted to SWP-2 due to a decrease in infiltration rate in SWP-1, which was attributed to sedimentation, algae, and silica gel forming on the bottom of the pond.

Under normal conditions, radioactivity is not present in any of the service waste streams except the Process Equipment Waste (PEW) evaporator overhead condensate, which routinely contains trace quantities of radionuclides. This waste is monitored for radioactivity and discharge to service waste percolation ponds, SWP-1 and SWP-2.

Numerous radionuclides were detected at activities above background in surficial samples from CPP-67 SWP-1. Cs-137 and U-238 were the only radionuclides detected above background in all surficial samples. Cs-137 was detected at the highest activity level at a value of 80.8±11.1 pCi/g. Activities for all radionuclides decreased with depth with one exception. Samples collected from 0.7 m (2.3 ft) to 1.7 m (5.7 ft) indicated all radionuclides, except Sr-90 and U-234, had decreased to activity levels below background. Samples collected closer to the center of the pond showed both the greatest number of radionuclides at activities above background and the highest activity for Sr-90, which was the most commonly detected radionuclide.

Based on the investigation results, the zone of contamination is estimated to be about 1.8 m (6.0 ft) thick and extends from the surface to 1.8 m (6.0 ft) bgs. Based on the dimensions of CPP-67 SWP-1, the volume of contaminated soil beneath SWP-1 was estimated to be 32,922 m^3 (1,180,800 ft^3).

Service Waste Percolation Pond No. 2 (SWP-2)

SWP-2 is located outside the south ICPP security fence, southeast of ICPP. SWP-2 was established in 1985 when it became apparent that the infiltration capacity of SWP-1 had decreased and water levels began to rise. The pit bottom is approximately 152.4 m (500 ft) square and 3.6 to 4.3 m (12 to 14 ft) deep. The pit was excavated in gravelly alluvium approximately 6.1 to 10.7 m (20 to 35 ft) thick, underlain with basalt. The pond is designed to accommodate continuous disposal of approximately 11.4 M L (3 M gal) of water per day.

Resource Conservation and Recovery Act clean-closure equivalency was achieved for metals contamination in Pond 1 in April 1994 and Pond 2 in May 1995; therefore, only radiological contamination will be assessed as part of the WAG 3 Remedial Investigation/Baseline Risk Assessment (RI/BRA).

Numerous radionuclides were present at activities above background at CPP-67 SWP-2. The majority of the radionuclides were detected in most of the surficial samples collected. Cs-137 was detected at the highest activity at a value of 93.6±0.4 pCi/g. The only detections of radionuclides in the 1.2 to 1.8 m (4.0 to 6.0 ft) samples were Np-237, which was detected in all five samples, and Pu-238 and Pu-239/240, which were detected in one sample only.

Based on the investigative results, the zone of contamination is assumed to be 1.8 m (6.0 ft) thick, and extends from the surface to 1.8 m (6.0 ft) bgs. This depth is based on the decrease in radionuclide COPCs with depth, and low activities measured in deeper samples. Based on the dimensions of the pit, the volume of contaminated soil beneath the pit was estimated to be 14,814 m^3 (150,000 ft^3) (DOE-ID 1997b).

H1-4.1.10 CPP-88

During construction activities at the ICPP, primarily digging and excavation, radiological contamination is occasionally discovered in the soils. Areas of contamination that are not located within other sites are included in site CPP-88. This contamination is measured by radiological control technicians using field instruments and is reported in Health Physics Survey Reports. These measurements are not isotope-specific (usually reported as total beta-gamma activity) and only provide a qualitative estimate of radioactivity, reported as cpm, or mR/hr depending on the instrument. Site CPP-88 includes only the measurements made on soils and excludes contamination associated with buildings, structures, and concrete or asphalt pads.

- Cs-137 and Sr-90 were the only radiological COPCs detected above background in site CPP-88 borings. The maximum Cs-137 and Sr-90 activities detected in surficial samples were 15.2±0.3 pCi/g and 6.4±0.3 pCi/g, respectively. Maximum activity levels from samples from the lowest sample interval, generally terminating at 3.0 m (10.0 ft), were 36.6±0.4 pCi/g and 2.0±0.3 pCi/g for Cs-136 and Sr-90, respectively. Cs-137 and Sr-90 activities generally decreased with depth.

Arsenic and thallium were the inorganic COPCs detected in CPP-88 samples at concentrations above background. These detections were generally isolated and only slightly above background.

The results of the risk assessment under current land at CPP-88 indicate that the increased cancer risk from exposure to site-related contaminants in barely within the EPA recommended target range. The increased cancer risk to hypothetical future onsite workers and residents are both within the EPA target range (DOE-ID 1997b).

H1-4.1.11 CPP-90

The leak associated with site CPP-90 is believed to have resulted in the detection of trace amounts of ruthenium (Ru-106) in the ICPP production wells in May 1959. Service waste from the PEW Evaporator System, CPP-633 (Waste Calcining Facility), floor drains, steam condensate lines, and equipment cooling jackets were routed via the service wasteline through the monitoring station in building CPP-709 to the CPP-23 injection well. Service wastes were routed through CPP-709 to the injection well from 1953 to 1984, after which service wastes were routed to the percolation ponds. The waste stream with the greatest potential for contamination was condensate from the PEW system, which was a source of Sr-90, Cs-137, Ru-106, and Co-60 (LITCO 1995).

The service waste transfer line originally consisted of a 24-in. (61-cm) concrete pipeline that ran approximately 164.6 m (540 ft) from CPP-709 to the CPP-23 injection well. Because of suspected deterioration of the line, which was assumed to be correlated to detections of trace amounts of ruthenium in upgradient CPP production wells, the concrete pipe was replaced in 1959-1960. The concrete pipe was

replaced with salt-glazed vitrified clay pipe, and the joints were sealed with a synthetic rubber polymer. In 1969, due to suspected releases of tritium from leaks in the transfer line assumed to be related to increase of tritium in the production wells, the vitrified clay pipe was abandoned in place and replaced with a stainless steel line. In 1976, a leak in the stainless steel line released approximately 70,000 L (18,500 gal) of contaminated water, approximately two-thirds of the line was subsequently replaced. During construction of building CPP-684 (Remote Analytical Laboratory) and the 1982 upgrade of the service wasteline, hot spots were detected along the pipeline. The service waste transfer line has not been used regularly since service wastes were directed to the percolation ponds in 1984. The transfer line and injection well were used only for emergency disposal purposes from1984 to 1986 when the injection well transfer line was permanently taken out of service. Most of the transfer lines were abandoned in place; however, the abandoned vitrified clay line was removed, except for the part underneath building CPP-684 where it was grouted in place.

The equipment in building CPP-709 monitored radiological constituents in the service wastewater before transfer to the CPP-23 injection well. The building was equipped with an alarm that signaled ICPP operators to terminate operations or divert the contaminated flows when radiological contamination was indicated by the monitoring equipment.

Based on the investigation results, the primary COPCs associated with this site are Cs-137 and Sr-90. These radionuclides were detected above background in borings drilled along the former pipeline that transferred service wastewater to the injection well through building CPP-709. Cs-137 concentrations above background were limited to the upper 3.0 m (10 ft) in all three borings. Sr-90 was only detected above background in three soil samples collected below a depth of 3.0 m (10 ft) bgs. Several polycyclic aromatic hydrocarbons were detected in the surface sample from boring CPP-90-3, but detections of these compounds do not appear to correlate with elevated Cs-137 concentrations and are not likely to be related to leaks from the transfer lines. The distribution of inorganics detected above background (i.e., mercury, arsenic, and antimony), suggests that these inorganics are not related to contamination at the site. Based on the distribution of radionuclides in soil, the zone of contamination at this site extends from the ground surface down the soil/basalt interface at a depth of about 14.7 m (48.1 ft). Elevated Cs-137 levels are confined to the upper 3.0 m (10 ft) while Sr-90 concentrations above background are present from about 6.1 to 12.8 m (20 to 42 ft). The volume of contaminated soil was estimated for the purpose of calculating a source term for the model using a depth of 14.7 m (48.1 ft), a length of the site of 164.6 m (540 ft), and a width of 3.0 m (10 ft) along the service waste line (DOE-ID 1997b).

H1-4.1.12 CPP-93

The nonradioactive, simulated calcine associated with site CPP-93 was generated in 1961 and 1962 during testing of building CPP-633 waste calcining equipment and systems before operation with high-level radioactive waste. Historical operator log entries and photographs indicate that several tons of simulated calcine material were disposed in the trench. The trench was approximately 61 m (200 ft) in length and 2.4 m (8 ft) in width at the bottom sloping to 4.9 m (16 ft) in width at the top. The trench contained 1.1 to 1.2 m (3.5 to 4 ft) of nonradioactive calcine before being backfilled to grade with approximately 1.2 m (4 ft) of topsoil. Based on photographs and operator logs, the trench was used for simulated calcine disposal from 1964 through 1966.

The analytical results from borings CPP-93-1 through CPP-93-4 confirm the presence of thin layers of simulated calcine material in the vicinity of a trench located southeast of building CPP-603. The presence of simulated calcine material is supported by visual observations in the borings and elevated concentrations of mercury, aluminum, nitrate/nitrite, and sodium. It was expected that the borings would penetrate 1.1 to 1.2-m (3.5 to 4-ft) thick layers of simulated calcine, but only 3 to 5-cm (1 to 2-in.) thick

bands of simulated calcine were found. It is believed that the majority of buried simulated calcine was removed during construction of the bin sets.

Samples of the simulated calcine contain elevated concentrations of mercury, aluminum, nitrate/nitrite, and sodium. Concentrations of sodium, nitrate/nitrite, and aluminum appear to decrease with depth in the borings to background levels, but mercury concentrations are still above background at the deepest samples in the borings. The full depth of mercury above background has not been defined, but the analytical data suggest that mercury concentrations would continue to decrease with depth below 3.0 m (10 ft). The results of additional borings drilled outside of the area of the trench indicate that significant lateral migration of mercury and aluminum from the buried calcine has not occurred.

The contaminated zone for this site is assumed to be from 0.8 to 7.6 m (2.5 to 25 ft). A volume of contaminated soil of 2,039 m^3 (72,000 ft^3) was estimated based on the reported dimensions of the trench. A full width of 4.9 m (16 ft) down to a depth of 7.6 m (25 ft) was used to account for some lateral migration of COPCs (DOE-ID 1997b).

H1-5. WAG 4

H1-5.1.1 WAG 4 Description

WAG 4 is the Central Facilities Area (CFA). Services for all of the INEEL are headquartered here, including environmental laboratories, security, fire protection, medical facilities, communications systems, warehouses, a cafeteria, vehicle and equipment pools, bus system, and laundry.

Potential release sites include spills, underground storage tanks, the INEEL landfill, ponds, leach fields, and leach pits. This WAG is divided into 13 OUs with 29 potential release sites. Potential contaminants include solvents, PCBs, asbestos, radionuclides, unexploded ordnance, heavy metals, and construction debris.

H1-5.1.2 WAG 4 ERA Results

Attachment H1-1 presents a summary of the sites of potential concern for ecological risk assessment.

H1-5.1.3 CFA-04 (OU 4-05: Pond)

This site consists of a shallow pond located southeast of the termination of Nevada Street which was formerly used for the disposal of wastes from operations at CFA-647. CFA-674 contained the Chemical Engineering Laboratory (CEL) that operated from 1953 until 1965 to conduct pilot studies of a nuclear waste calcining process on simulated (no fuel) nuclear fuel rods. Building CFA-674 is now used as a warehouse and also contains a photography laboratory. There are no current discharges from the building to the pond.

Three waste generation processes were identified as source of contamination from CFA-674 to the pond in the Track 2 Preliminary Scoping Package: (1) from approximately 1953 to 1965, mercury-contamination waste from the calcine development work in CFA-647; (2) from approximately 1953 to 1969, liquid laboratory effluent from the CEL; and (3) dates unknown, bulky waste including asbestos-containing roofing material from construction projects at the INEEL

Liquid and solid waste, resulting from operations at the CEL, may have included simulated calcine, sodium nitrate, nitric acid, tributyl phosphate, uranyl nitrate, a high grade kerosene, aluminum nitrate, as well as hydrochloric and chromic acid, di-chromate solutions, terphenyls, heating oil, zirconium, hydrofluoric acid, trichlorethylene, and acetone.

High concentrations of mercury were often present in the calcine because it was used as a catalyst in the dissolution of simulated aluminum nuclear fuel cladding. Effluent from scrubbers on the calciners would also have contained mercury, probably in the form of mercuric nitrate. In a small number of the tests conducted, chemical tracers (chromium, copper, iron, and nickel) or radioactive tracers (Cs-137, Sr-90, Ru-106, and uranium isotopes) were used to characterize parameters of interest in the calcine process. Most calcine was disposed to the pond and buried; however, limited quantities were contained in bottles, which were also buried in the pond.

Data from the 1994, 1995, 1997, and 1998 sampling activities are used in this RI/BRA to characterize the nature and extent of contamination. Samples were collected and analyzed for inorganics, PCBs, metals, radionuclides, VOCs and SVOCs. The initial contaminant screen presented in the RI/FS Work Plan identified Aroclor-1254, arsenic, carbazole, lead, mercury, Cs-137, U-234, U-235, and U-238 as COPCs. The results of the supplemental contaminant screen indicates Aroclor-1254, arsenic, mercury, Cs-137, U-234, U-235, and U-238 are retained as COPCs for further evaluation in the RI/BRA. Arsenic was detected in 97.9% of 95 samples. Mercury was detected in 78.7 percent of 136 samples. Cs-137 was detected in 48% of 25 samples. U-234 and U-238 were both detected in 100 percent of 46 samples for each COPC. U-235 was detected in 75.4% of 69 samples. The range of detected concentrations of arsenic was 3.1 to 22.4 mg/kg; mercury, 012 to 439 mg/kg; Cs-137, 0.0742 to 2 pCi/g; U-234, 0.651 to 22.6 pCi/g; U-235, 0.0225 to 1.6 pCi/g; and U-238, 0.73 to 35 pCi/g.

These data indicate that surface and subsurface soils 0 to 2.4 m (0 to 8 ft) bgs at CFA-04 are contaminated with low levels of arsenic, mercury, Cs-137, U-234, U-235, and U-238. Arsenic is not associated with known waste-producing processes at WAG 4; however, arsenic is retained as a COPC for CFA-04 because the maximum detected concentration slightly exceeds the range of measured concentrations at the INEEL. Past waste-producing activities at CFA-04 may have resulted in concentrating naturally occurring levels of arsenic at this site. It is assumed that the downward mobility of metals and radionuclides suspended in liquids in the vadose zone (i.e., wastewater) is approximately 3.0 m (10 ft). Therefore, contamination is assumed to exist in CFA-04 soils from 0 to 5.5 m (0 to 18 ft) bgs. This assumption is made to ensure that potential risks from exposures at CFA-04 are not underestimated. This assumption is conservative because sample results are not available for depths greater than 2.4 m (8 ft) bgs; however, the entire 0 to 5.5-m (0 to 18-ft) soil interval is assumed to be contaminated.

H1-5.1.4 CFA-05 (OU 4-11: Motor Pool Pond)

The CFA-05 Motor Pool Pond consists of an unlined evaporation pond located in an abandoned borrow pit approximately 3,656 (12,000 ft) east of the CFA Equipment Storage Yard. The site includes the sediments of the pond, sediments along the inlet ditch, and the sediment at the discharge pipe. The pond received waste from the waste bay and outside sumps.

Analytical data from the investigation indicate that metals are present in the sediments above background concentrations. These include barium; 92.4 to 434, beryllium; 0.22 to 1.4 mg/kg, cadmium; 0.53 to 38.8 mg/kg, chromium; 8.2 to 911.3 mg/kg, lead; 10.6 to 631 mg/kg, mercury; 0.06 to 1.2 mg/kg, thallium; 0.3 to 1.0. The highest concentrations of metals were found in the sediment along the ditch from 0 to 2 m (0 to 7 ft) in depth and in sediments along the ditch. The VOC data indicate that four compounds (acetone, 90 ug/kg; 2-butanone, 40 ug/kg; 4-methyl2-pentanone, 40 ug/kg; methylene chloride, 40 ug/kg; and tetrachloroethylene, 76 ug/kg) were detected at a depth of 4 m (13 ft) in the pond

sediments. Aroclor-1260 was detected in sediments near the outlet pipe at a concentration of 1,470 ug/kg. Radionuclides (Am-241 – 2.72 pCi/g, Cs-137 – 8.4 pCi/g, and Pu-239 – 4.29 pCi/g) were detected in surface sediments of the ditch and pond. The OU 4-11 BRA for the site indicates that the potential risks to human health are within the acceptable risk range for future residential exposure pathways and consequently, the Record of Decision (ROD) documents a "no further action decision" (DOE-ID 2000).

H1-5.1.5 CFA-06 (OU 4-06: Lead Shop)

This site consists of the area surrounding Building CFA-687. CFA-687 was used for lead recycling from 1953 to 1986. Lead scrap from INEEL operations was shipped to CFA-687 and temporarily stored on the ground outside the building until it was processed. CFA-06 is composed of a 2,529 m^2 (3,024 yd^2) area, located predominately north and northeast of the previously existing building. No records exist on actual quantities of lead scrap stored near the building. Lead storage resulted in surface and subsurface soil contamination. The lead recycling shop ceased operations in 1986, is no longer used for lead storage or processing and was demolished during the summer of 1997.

The analytical data from verification samples indicate the residual contamination at CFA-06 consists of low levels of arsenic that exceed the risk-based concentration of 0.43 mg/kg, but are below the 23 mg/kg cleanup goal (detections ranged from 10.4 to 14.5 mg/kg) and lead detected below the 400 mg/kg screening level (detections ranged from 10.4 to 153 mg/kg) in the top 15 cm (6 in) of soil. Based on the supplemental contaminant screening that used the maximum detected verification results, these contaminants are no longer considered COPCs. Detected concentrations of arsenic are not source-related and are assumed to be within the range of background concentrations for INEEL soils. Lead is below screening levels. Arsenic and lead are eliminated as COPCs; therefore, this site is eliminated from further consideration in the RI/BRA (DOE-ID 2000).

H1-5.1.6 CFA-08 (OU 4-08: Sewage Plant (CFA-691), Septic Tank (CFA-716) and Drainfield

OU 4-08 consists of potential releases from the components of the STP, the septic tank, the pumping station, the drainfield, existing and abandoned lines from the pumping station to the drainfield, the abandoned sludge drying bed that was a part of the Navy sewer system at CFA, the perched water residue in sedimentary interbeds below and adjacent to the drainfield, and surface soils downwind of the CFA-08 sewer system and drainfield.

The CFA-08 drainfield is located approximately 450 m (1,476 ft) northeast of the STP. The dimensions of the drainfield are 61 × 305 m (200 × 1,000 ft). It consists of five distribution areas (DAs), each with a distribution box and 20 distribution lines. The drainfield distribution lines are made of concrete drain tiles that lie approximately 1.0 m (3.5 ft) bgs. The first two drainfields were installed as part of the Navy's sewer system and were in operation since 1944. Two additional DAs were installed as part of the new sewer system in 1953, and a fifth DA was added in 1961. Based on process knowledge, the CFA-08 drainfield received wastewater containing radiological and other effluent.

When the fifth DA was added to the drainfield in 1961, the original two 10-cm (4 in.) pipelines between the pumping station and the drainfield were capped and abandoned in place. The pipelines were replaced with a new 20-cm (8-in.) trunk line and feeder lines going to each of the distribution boxes and drainfield batteries. Two influent pipelines connect south of the STP, and a single influent line extends to the STP. To accommodate overflow, a pipeline ran from the adjoining influent lines to the CFA-716 septic tank.

The CFA-08 STP was used to treat and dispose of CFA process wastewater from 1953 to 1995. The original system, installed by the Navy in 1944, handled wastewaters until 1953. The original Navy system was upgraded in 1953 to include a pump station, tickling filters, and a digester. The Navy plant is presumed to have handled only sanitary wastewater until 1950 when the original hot laundry was built. The hot laundry processed clothing contaminated with low-levels of radionuclides. The wastewater from this process was discharged directly from the plant. The STP received effluent from the hot laundry via the drain pipe until the drain pipe was abandoned in place 1980. The STP was deactivated in 1995.

The initial contaminant screen presented in the RI/FS Work Plan identified Aroclor-1254, Arocor-1260, arsenic, carbazole, isophorone, Am-241, Co-60, Cs-137, Eu-152, Eu-154, Pu-239/240, and U-235 as COPCs for CFA-08 and Co-60, radium (Ra)-226, and U-235 as COPCs for CFA-49. The COPCs identified in the Work Plan for CFA-08 were selected on a sitewide basis (i.e., COPCs were not selected separately for the drainfield, pipeline, and STP). The COPCs identified for CFA-08 in the Work Plan were assumed to be preliminary COPCs for the drainfield, pipeline, and the STP. Preliminary COPCs for the CFA-08 STP also assumed to include Ra-226, which was identified in the Work Plan as a COPC for CFA-49.

The results of the supplemental contaminant screen indicate that Aroclor-1254, Cs-137, Pu-239/240, and U-235 are retained for further evaluation in the RI/BRA. Detected concentrations of arsenic are not source related and are assumed to be within the range of background concentrations for INEEL soil. Arsenic is, therefore, eliminated as a COPC. Cs-137 was detected in 72.3% of 65 samples in concentrations ranging from 0.0795 to 180 pCi/g. Pu-239/240 was detected from 0.07 to 2.9 pCi/g, and U-235 from 0.031 to 0.44 pCi/g.

The supplemental contaminant screen for the CFA-08 pipeline, indicates that all of the Work Plan COPCs were eliminated from further evaluation in the BRA. Of the Work Plan COPCs, Aroclor-1254, Aroclor-1260, arsenic, Cs-137, and U-235 were all below screening levels; Am-241 Co-60, Eu-152, and Eu-154 were not detected; and carbazole, isophorone, and Pu-239/240 were not sampled. Detected concentrations of arsenic are not source related and are assumed to be within the range of background concentrations for INEEL soil. Arsenic is, therefore, eliminated as a COPC. Based on these results, the CFA-08 pipeline is eliminated from further consideration in the BRA.

Under D&D Program, subsurface soil samples were collected in the vicinity of the STP. Subsurface samples were analyzed for inorganics, metals, herbicides, PCBs, radionuclides, VOCs, and SVOCs. The results of the supplemental contaminant screen indicate Ra-226 and U-235 are retained for further evaluation in the RI/BRA. Detected concentrations of arsenic are not source related and are assumed to be within the range of background concentrations for INEEL soil. Arsenic is, therefore, eliminated as a COPC. Ra-226 was detected in 100% of 13 samples and U-235 was detected in 73.1% of 26 samples. The range of detected concentrations of Ra-226 was 1.25 to 3.04 pCi/g; and U-235, 0.0195 to 0.232 pCi/g (DOE-ID 2000).

H1-5.1.7 CFA-10 (OU 4-09: Transformer Yard Oil Spills)

CFA-10 is the site of possible PCB spills from storage of electrical transformers and waste disposed to the ground from welding shop operations. CFA-10 is a fenced yard area located adjacent to Building CFA-667, which was used as a welding shop from approximately 1958 to 1985. Waste from the welding shop may have included small amounts of solvents, along with chromium, cadmium, lead, zinc, and nickel. Process knowledge indicates that the CFA-10 yard was not used to routinely dispose of waste, although some accidental spills of solid metals may have occurred. From 1985 to 1990, a 6.1 m (20 ft) wide by 20 m (65 ft) long concrete pad at the site was used as a temporary storage location for transformers, which may have contained PCBs, although there were no documented or suspect leaks or spills from the transformers.

An initial contaminant screening was performed in the OU 3-13 Work Plan using the Track 2 data. This screen identified the following contaminants as COPCs: arsenic, lead, Aroclor-1254, and Aroclor-1260. The results of the supplemental contaminant screen conducted as part of this RI/BRA indicate that lead, Aroclor-1254, and Aroclor-1260 are retained as COPCs for further evaluation in the BRA. Detected concentrations of arsenic are not source related and are assumed to be within the range of background concentrations for INEEL soils. Arsenic is, therefore, eliminated as a COPC. The other contaminants were eliminated from further evaluation.

Analytical data collected during 1997 and 1998 (a total of 8 locations) indicate that the surface soils to 0–0.15 m (0–0.5 ft) bgs at CFA-10 are contaminated with lead at concentrations ranging from 16.5 to 5,560 mg/kg. The full extent of contamination is possibly greater than just these locations because no specific pattern of welding activities or waste disposal of scrap lead in the yard could be identified. For risk assessment purposes, a depth of 0 to 3.05 m (0–10 ft) bgs is assumed for evaluation of residential exposure pathways. Therefore, it is assumed that the full area of the yard (808 m^2 [966 yd^2]) is contaminated to a depth of approximately 3.05 m (10 ft). The depth of contamination is assumed to be limited to the soil surface (less than or equal to 0.15 m (0.5 ft). Downward migration is not assumed to occur based on previous removal actions as contaminated soil was removed. The source-term volume is 2,463 m^3 (3,222 yd^3) of lead-contaminated soil based on the above assumption (DOE-ID 2000).

H1-5.1.8 CFA-12 (OU 4-07: French Drains)

This site consists of two french drains (commonly referred to as the north and south french drains) located east of the north corner of Building CFA-690, which housed several laboratories and offices operated by the DOE Radiological and Environmental Sciences Laboratory. The french drains were unlined concrete cylinders approximately 0.6 m (2 ft) in diameter. The bottom of the drains was 1.8 m (6 ft) bgs. Process knowledge indicates that the types of waste disposed in the drains via sink in the laboratory included dilute acids, containing low levels of radioactivity. Use of the sinks was discontinued in 1984, and the floor drains were capped inside the building.

The initial contaminant screen presented in the RI/FS Work Plan eliminated SVOCs and several radionuclides from further evaluation. The results of the supplemental contaminant screen presented indicate that Ag-108m, Am-241, Ba-133, Cs-137, Eu-152, U-235, U-238, should be retained for further evaluation in the RI/BRA. The detection frequency for Ag-108m, Am-241 Ba-133, Cs-127, Eu-152, and U-238 is 100 percent. U-235 was detected in 50% of the samples. The range of detected concentrations is as follows:

- Ag-108m 2.46 pCi/g (only one positive detection is reported)
- Am-241 0.09 to 23.7 pCi/g
- Ba-133 0.77 pCi/g (only one positive detection is reported)
- Cs-137 10.2 to 1,070 pCi/g
- Eu-152 10.6 pCi/g (only one positive detection is reported)
- U-235 1.2 to 2.4 pCi/g
- U-238 0.8 to 18.3 pCi/g.

The Track 2 measured concentrations indicate that subsurface soils (2.6 m (8.5 ft) bgs) at the south drain of CFA-12 are contaminated with low levels of radionuclides (i.e., Ag-108m, Am-241, Ba-133, Cs-137, Eu-152, U-235, U-238).

Excavation of contaminated soils from 0 to 2.6 m (0 to 8.5 ft) bgs was conducted in July 1995. The soil in this depth interval is clean because it has been backfilled with clean soil. The extent of contamination at the site exists at 2.6 m (8.5 ft) bgs (the depth at which basalt was encountered), and encompasses the area of the CFA-12 south drain, approximately 13.4 m^2 (16.0 yd^2). Because soils at CFA-12 have been remediated and the area backfilled with clean soil, the residual contamination, which is present at 2.6 m (8.5 ft) bgs, occurs in the basalt. The volume of soil, associated with contamination bgs at CFA-12, is assumed to extend from 0 to 2.6 m (0 to 8.5 ft) and is 35 m^3 (45.8 yd^3) for the future residential risk evaluation. Although contamination does not exist from the surface to basalt, the entire interval in evaluated due to a potential excavation of soils for a future residential scenario. This assumption is made to ensure that potential risks from exposure to CFA-12 are not underestimated. This assumption is conservative because sample results are not available for depths greater than 2.6 m (8.5 ft) bgs; however, the entire 0 to 2.6 m (0 to 8.5 ft) (DOE-ID 2000).

H1-5.1.9 CFA-13 (OU 4-02: Dry Well)

This site consisted of a dry well located south of the demolished locomotive repair shop Building CFA-640. Building CFA-640 was built in 1950 and provided offices for Security and Power Management, a small area for security physical fitness, a line crew craft area, an automotive repair garage, and a locomotive repair area. The building had a floor drain connected to piping, which ran outside of the building that was cut and capped. This piping might have run into the CFA-13 dry well; therefore, it is possible that VOCs, SVOCs PCBs, petroleum products, metals, and radiological contaminants were discharged to the dry well through this drain.

Data from the 1997 removal activities are used in this RI/BRA to characterize the nature and extent of contamination. These data indicate that subsurface soils 0.9 to 6.1 m (3 to 20 ft) bgs at CFA-13 are contaminated with benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, Aroclor-1254, lead, Am-241, Ra-226, U-235, U-238, and zirconium (Zr)-95. The depth of basalt at CFA-13 is unknown; therefore, contamination is assumed to exist in CFA-13 soils from 0.9 to 9.1 m (3 to 30 ft) bgs. This assumption is conservative because sample results are not available for depths greater than 6.1 m (20 ft) bgs; however, the entire 0 to 9.1 m (0 to 30 ft) soil interval is assumed to be contaminated (DOE-ID 2000).

The extent of contamination is assumed to encompass the entire site [approximately 25 m^2 (269 ft^2]). The volume of soil associated with the contamination at CFA-13 is 227.5 m^3 (2997 yd^3).

H1-5.1.10 CFA-15 (OU 4-02: Dry Well)

This site consisted of a dry well 0.6 m (2 ft) in diameter northwest of Building CFA-674 between the building and Nevada Street. No records were found on this site to indicate that waste was sent to this dry well. However, further investigation identified a floor drain inside building CFA-674 with piping connected to the dry well. Therefore, a potential existed that this dry well may have received laboratory liquid waste and solid calcined waste.

Data from the 1997 removal activities are used in this RI/BRA to characterize the nature and extent of contamination. These data indicate that subsurface soils 0.61 to 4.9 m (2 to 16 ft) bgs at CFA-15 are contaminated with low levels of Ra-226. It is assumed that the downward mobility of radionuclides suspended in liquids in the vadose zone (i.e., wastewater) is approximately 3.0 m (10 ft). The depth of basalt at CFA-15 is unknown; therefore, contamination is assumed to exist at CFA-15 soils from 0.61 to 7.9 m (2 to 26 ft) bgs. This assumption is made to ensure that potential risks from exposure at CFA-15 are not underestimated. This assumption is conservative because sample results are not available for depths greater than 4.9 m (16 ft) bgs; however, the entire 0 to 7.9 m (0 to 26 ft) soil interval is assumed to be contaminated (DOE-ID 2000).

H1-5.1.11 CFA-17/ CFA-47 (OU 4-05: Fire Department Training Area [bermed] and Fire Station Chemical Disposal)

The CFA-17 Fire Department Training Area is located approximately 6 km (4 mi) north of CFA, directly east of Lincoln Boulevard with an area of approximately 1,960.6 m^2 (2,349 yd^2). The training area at CFA-17 was used by the fire department for fire training exercises from 1958 to 1995. The area consists of an old leach pond and a gravel fire training pad. The leach pond was used to collect wastewater from extinguished fires generated during training exercises. This wastewater contained unburned fuel, products of combustion, and possible solvent residue. The gravel training pad was first used to burn fuel directly on the ground. In 1988 the gravel pad was covered with asphalt, and the area was contaminated with petroleum hydrocarbons. Approximately 18 m (60 ft) southeast of the CFA-17 asphalt training pad and outside the bermed area, a pile of terphenyls (a brown waxlike substance) and trinitrotoluene (TNT) that resulted from CFA-17 fire station chemical disposal activities was located at the ground surface in an area approximately 0.93 m^2 (1.1 yd^2). The terphenyl area is designated as CFA-47 under OU 4-05. CFA-17 and -47 are evaluated in the BRA as a single contaminant source area because they are adjacent and contain similar wastes.

Several upgrades have occurred at the CFA-17 fire training area. The first upgrade included installation of piping to divert wastewater to a shallow drainage ditch along the north and east sides of the asphalt pad. A pipe was also installed to connect the ditch to a leach pond. Following this upgrade, wastewater and unburned fuel would drain to the pond via the drainage ditch. A second upgrade occurred in 1987 in which the leach pond and surrounding area were excavated to remove soil contaminated with unburned fuel, combustion products, solvents, and chemicals. This method of disposal was used from 1981 to 1987. The amount of soil removed is unknown. A third upgrade was performed in 1988, which consisted of replacing the leach pond with a lined evaporation pond and adding asphalt paving over the existing gravel pad.

Additional areas were added to CFA-17 in September 1994. These areas included the soil around and beneath the existing asphalt pad and the soil surrounding the drafting pit east of the fire training tower. Chemicals from various INEEL facilities were burned directly on the gravel pad or in containers at the training area. The soil near the drafting pit was included because unused nonradioactive, sodium-potassium (NaK) from the Experimental Breeder Reactor (EBR) I was processed in 1970. The drafting pit, normally used to test fire truck pumps, was used to process the NaK. Processing was performed by piping the NaK to nozzles in the bottom of the drafting pit, which was filled with an aqueous solution of sodium and potassium hydroxide. An exothermic reaction occurred when the nozzles malfunctioned, causing the solution to boil and overflow the drafting pit. Approximately 75,700 L (20,000 gal) of the solution drained to the ground in an area east of the pit. The solution contained sodium and potassium salts. The estimated maximum quantity of NaK released during the process was 2,500 L (660 gal).

The initial contaminant screen presented in the Work Plan eliminated metals and SVOCs from further evaluation, and identified Aroclor-1260, arsenic, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, lead, and phenanthrene. The results of the supplemental contaminant screen, indicates benzo(g,h,i)perylene and phenanthrene are retained as COPCs for further evaluation in the BRA. Benzo(g,h,i)perylene was detected in 2.3% of 43 samples. Phenanthrene was detected in 4.7% of 43 samples. The maximum detected concentration of benzo(g,h,i)perylene was 0.16 mg/kg; phenanthrene was detected from 0.0252 to 0.14 mg/kg.

Arsenic, lead, and Aroclor-1260 were not included in the post-removal action sampling analyses. The arsenic concentrations that were detected in the OU 4-05 Track 2 sampling ranged from 11 mg/kg to 6.1 mg/kg. These concentrations are slightly above the INEEL arsenic background concentration of 5.8 mg/kg. The contamination generating activities at CFA 17/47 would not have produced arsenic contamination, so the detected arsenic concentrations are believed to be naturally occurring.

The maximum lead concentration that was detected in the Track 2 sampling was 28.5 mg/kg. This concentration is higher than the INEEL lead background concentration of 17 mg/kg, but it is much lower than the 400 mg/kg residential lead cleanup standard that has been established by the EPA.

The Aroclor-1260 concentration that was detected in the Track 2 sampling ranged from 0.12 mg/kg to 0.062 mg/kg. Aroclor-1260 was detected in 3 samples out of 13 at a depth of 0–15 cm (0–0.6 in). The maximum detected concentration is slightly higher than the EPA Region III risk-based concentration for PCBs (0.083 mg/kg), so any PCB contamination that remains at the site is unlikely to produce a large impact to human health or the environment.

The omission of these three contaminants from the post-removal action sampling produces some uncertainty in the site's risk assessment.

Measured concentrations collected at CFA-17/47 indicate that subsurface soils (0.15 to 0.9 m (0.5 to 3 ft) bgs) at CFA are contaminated with low levels of benzo(g,h,i)perylene and phenanthrene. During the 1997 removal action, basalt was encountered from 0.9 to 6.1 m (3 to 20 ft) bgs. Residual contamination is assumed to occur above the 6.1-m (20-ft) assumed site-wide depth to basalt. The residual contamination is not expected to migrate beyond 6.1 m (20 ft) bgs due to the presence of basalt at this depth (DOE-ID 2000).

H1-5.1.12 CFA-26 (OU 4-09: Pump Station Fuel Spill)

CFA-26 is the site of a 209,700-L (55,400-gal) potential loss of diesel fuel. The 227,600 L (55,000 gal) aboveground storage tank was constructed in 1950 and removed in 1986. The loss of fuel occurred over the period from January to March 1979 and was discovered as a result of tank gauging measurements. The heating system was designed to circulate the fuel oil in the tank through the manifold to keep it warm during the winter. The sump consisted of a square concrete-walled structure approximately 1.8 × 1.8 m (6 ft × 6 ft) in size with the top of the sump at the ground surface. The floor of the sump, located 1.2 m (4 ft) bgs, was open to the soil/gravel. The heating manifold was accessed through a manhole cover at the ground surface.

The cause of the leak was determined to be a small hole in a steam heating manifold, which was located in a piping sump adjacent to the tank. The leak would have discharged directly to the subsurface soils via the gravel bottom of the sump (1.2 m [4 ft] bgs) over a 3-month period, which would have required a minimum discharge rate of 0.4275 gal/min.

Integrity tests performed on the tank after the incident revealed that the tank was not the source of leakage. The location of the former tank is now occupied by building CFA-623, the Multicrafts Shop. Interviews with personnel who worked on the foundation construction revealed that diesel fuel odor or stained soil was not noticed during the construction period. The above information indicates that the discharge occurred primarily to the subsurface soil.

Data collected during the Track 2 investigation indicate that surface soils to a depth of 3 m (10 ft) are not contaminated and that TPH contamination was detected in the soil at approximately 3 to 4.4 m (10 to 11.2 ft). All contaminants at CFA-26 were eliminated in the contaminant screen in the Work Plan, therefore, eliminating a supplemental contaminant screen. However, the potential exists for petroleum contamination in the basalt; consequently, the groundwater exposure pathway to assess cumulative risk to groundwater is evaluated in Section 6 of the WAG 4 RI/FS (DOE-ID 2000).

H1-5.1.13 CFA-43 (OU 4-06: Lead Storage Area)

This site consists of a storage yard south of Building CFA-674. From 1940 to 1988, this site was used for storage of excess materials, including scrap lead and batteries. In 1988, a molten lead spill of approximately 4.5 kg (10 lb) occurred along the southwest fenced area, which may have resulted in soil contamination. The spilled lead was allowed to harden, was raked up, and recycled. The storage area has been regraded several times since 1988. Following the removal action at OU 4-06 in October 1996, the storage area was covered with a clean layer of packed gravel. The area is currently fenced and contains used office furniture and other stored nonhazardous equipment and supplies for private market sale or disposal.

The removal action consisted of removing soil contamination with lead to a level below the 400 mg/kg lead screening level. Approximately 304 m^3 (400 yd^3) of contaminated soil was excavated and shipped offsite to a treatment, storage, and disposal facility. Sixty-five samples, representing post-removal verification samples, were submitted for total lead analysis. Sixty-four of the samples had total lead concentrations below the 400 mg/kg lead screening level. One of the 65, however, exceeded the total lead screening level of 400 mg/kg with a concentration of 650 mg/kg. This location was reexcavated and resampled for total lead. This verification sample result for the reexcavated area was below 400 mg/kg.

Post-removal verification analytical results for CFA-43 indicate that lead at the site is below the EPA (1994) lead screening level of 400 mg/kg and, therefore, has been adequately remediated. Based on these results, CFA-43 is eliminated from further consideration in the BRA (DOE-ID-10680, 2000).

H1-5.1.14 CFA-51 (OU 4-13: Dry well at North End of CFA-640)

This site is a former small dry well located at the north end of Building CFA-640. The dry well was discovered on December 13, 1995, during excavation of the building's water lines as part of CFA-640 D&D Program activities. The site added to the FFA/CO due to the potential release of contaminants.

The dry well was constructed from a short section of clay sewer pipe set vertically in the ground. The pipe was approximately 0.46 m (1.5 ft) in diameter and 0.61 to 0.91 m (2 to 3 ft) in length with a round steel cover at the ground surface. A smaller buried pipe connected the dry well to CFA-640. The source of potential contamination within CFA-640 was the floor drain in the building, which served a garage area for vehicle repair and parking. The floor drain was covered when the garage was modified for other uses.

Based on the supplemental contaminant screen, no further evaluation is necessary at the site, and CFA-51 is eliminated from further consideration in the BRA (DOE-ID 2000).

H1-6. WAG 5

H1-6.1.1 WAG 5 Description

WAG 5 consists of the Power Burst Facility (PBF) and the Auxiliary Reactor Area (ARA). PBF is located in an area originally constructed for the Special Power Excursion Reactor Tests (SPERT). The four SPERT reactors, built in the late 1950s, have been removed and the facilities have undergone partial or complete D&D. The PBF reactor is still operational and is currently in standby mode. Four groupings of buildings are designated as the ARA. These facilities supported various activities including the operation of test reactors. All the reactors have been removed, and the facility has undergone partial or complete D&D.

Potential release sites include tanks, evaporation ponds, percolation ponds, leach fields, pits, and dry wells. This WAG is divided into 13 OUs with 48 potential release sites. Potential contaminants are petroleum products, hazardous waste, radionuclides, metals, radioactively contaminated soil, rubble, and debris.

H1-6.1.2 WAG 5 ERA Results

Attachment H1-1 presents a summary of the sites of potential concern for ecological risk assessment.

H1-6.1.3 ARA-01 (Chemical Evaporation Pond)

The ARA-01 site is a shallow, unlined surface impoundment that was used to dispose of laboratory wastewater from the ARA-I Shop and Maintenance Building (ARA-627). The pond, located southeast of the ARA-627 building, was constructed in 1970 by excavating native soil to create a topographic depression. Basalt outcrops are present within and immediately adjacent to the pond. The maximum surface soil depth within the pond is 1.1 m (3.5 ft), and the average surface soil depth is approximately 0.5 m (1.5 ft). The pond received process discharges that until 1988 contained small quantities of radioactive substances, acids, bases, and VOCs. The pond is now dry, except during spring runoff and heavy precipitation.

The chemical evaporation pond sediments were investigated from 1982 to 1990 and again in 1997 for the presence of contamination. Metals, VOCs, and radionuclides were detected in the sediments in investigations before 1990 (Stanisich et al. 1992). Arsenic, chromium(III), chromium(IV), cadmium, beryllium, Cs-134, Cs-137, Co-60, Pu-239, and U-234 were detected in the 1990 sampling campaign (Stanisich et al. 1992). The maximum concentration of radionuclides in these samples was 297 pCi/g of Cs-137, 11.4 pCi/g of Cs-134, 8.14 pCi/g of Co-60, 2.6 pCi/g of Pu-239, and 1.6 pCi/g of U-234. The samples with the highest contaminant concentrations were collected adjacent to the pond inlet. To determine background metal concentrations, 10 samples also were taken south of the pond in an area unaffected by ARA activities.

The conclusion of the ARA-01 ROD was that no remedial action is necessary to protect human health and the environment. However, the ROD stipulated that additional evaluation of subsurface conditions and the groundwater pathway would be conducted in a future investigation that will be completed before the INEEL Sitewide ROD is finalized. Consequently, a data need was identified in the WAG 5 Work Plan (DOE-ID 1997) to determine the vertical extent of the contamination. To meet this data need, two boreholes were planned at biased locations, meaning that samples would be collected at

the locations of the highest expected contaminant concentrations (i.e., the location of the highest previously detected Cs-137 concentration, and the area of the pond with the lowest elevation). For both boreholes, sample collection was planned at depths of 0 to 15 cm (0 to 6 in.), 1 to 1.2 m (3.5 to 4 ft), and 2.9 to 3 m (9.5 to 10 ft), and in the first interbed at an estimated depth of 7.6 m (25 ft) bgs.

During drilling, it became apparent that the basalt was too near the surface (the soil is only 0.6 m (2 ft) thick) to collect the samples at 1 to 1.2 m (3.5 to 4 ft) or 2.9 to 3 m (9.5 to 10 ft). It also became apparent that a 7.6-m (25-ft) interbed does not exist beneath the pond and the subsurface geology consists of fracture and rubble zones. The first borehole was drilled to a depth of 28.7 m (94 ft) without encountering an interbed. At 36 m (118 ft), the drill string and bit became stuck and only part of the drill string, the top 10.7 m (35 ft), was recovered. Therefore, no subsurface samples were obtained from either borehole.

The WAG 5 Work Plan (DOE-ID 1997) also called for a gamma detector to log both boreholes to the depth of the anticipated 7.6-m (25-ft) interbed. Instead, gamma logging was completed down to 28.7 m (94 ft) in the first borehole and 10.7 m (35 ft) in the second. The results of the gamma logging indicated an average Cs-137 concentration of 0.38 + 0.03 pCi/g to a depth of 0.9 m (3 ft) bgs. No other gamma-emitting radionuclides were detected. Cs-137 was not detected at depth. The use of a beta detector was not planned or identified in the WAG 5 FSP (DOE-ID 1997), but when one became available, it was used to log the subsurface. The in situ beta measurements were collected, starting at a depth of 1.2 m (4 ft) bgs (below the well casing) and continuing to the bottom of each borehole. No anthropogenic radionuclides were detected with the in situ beta radionuclide assay system in either borehole.

A second data gap was the lack of data about the presence and average concentrations of alpha-emitting isotopes and Sr-90. During the 1990 remedial investigation, only one sample was analyzed for alpha isotopes, and Sr-90 analysis was not performed. Therefore, potential risks from these contaminants could not be evaluated. The single 1990 sample for alpha analysis was collected in the area with elevated Cs-137 activity and yielded concentrations of Pu-239 and U-234 at the levels of 2.6 and 1.6 pCi/g, respectively. To adequately meet the data need, additional samples were specified for alpha isotopic and Sr-90 analyses in the WAG 5 Work Plan (DOE-ID 1997).

The ARA-01 site was retained for quantitative risk assessment in the comprehensive BRA to evaluate the risk from contamination detected in the evaporation pond soils. Detected contaminants include Am-241, Cs-137, Sr-90, U-235, Pu-238, Pu-239/240, Ra-226, arsenic, lead, and thallium (DOE-ID 1999).

H1-6.1.4 ARA-02 (Sanitary Waste Leach Field and Seepage Pit)

The ARA-02 site is a sanitary septic system comprising three septic tanks in series, a seepage pit, and associated piping. The system was built in 1960 and serviced permanent and temporary ARA-I buildings until 1988 when ARA-I was inactivated. The ARA-02 septic system was designed and intended exclusively for sanitary waste. No known process waste was routed to the system and no recorded spills or documented incidents were associated with the septic system. However, periodic radiological control surveys indicated radiological contamination. The source of the contamination was unknown. As part of a Track 2 investigation, soil samples were collected along the main line and outside of the seepage pit and septic tanks. The contents of the tanks, seepage pit, and main line also were sampled. The septic tanks and seepage pit contained listed mixed waste, and low concentrations of contaminants were detected in the soils along the sides of the septic tanks and seepage pit. The soil samples obtained outside the seepage pit showed no resource conservation and recovery act hazardous constituents. Low levels of beryllium, U-234, U-238, and Sr-90 were detected during the Track 2 sampling of the pipeline between the septic tanks and the seepage pit. Samples were not analyzed for

gamma-emitting radionuclides. In addition, the liquid levels inside the tanks were observed and found to vary over time, which indicated possible leakage to the soils below. On the basis of the risk evaluation, removal of the septic tank contents, confirmation sampling, and a reevaluation of the site in the WAG 5 comprehensive RI/FS were recommended in the Track 2 investigation.

In September 1996, a time critical removal action was implemented at ARA-02 to remove the septic tank contents and to sample the seepage pit interior. The contents of all three septic tanks were removed and placed in drums in an approved temporary accumulation area to await final disposition. The sampling information from the 1996 removal action was reviewed and incorporated into the RI/FS.

Sampling plans for the septic tank soils included collecting soil from boreholes drilled beside each of the three septic tanks and sampling the basalt interface. Boreholes were drilled, and samples were obtained from the soils adjacent to the first two septic tanks. Several attempts to drill a borehole next to the third septic tank were unsuccessful. Apparently, the septic tank was blasted into basalt, and the interface was found to be only several feet below land surface. Therefore, samples could be collected only from shallow soils rather than at the base of the tank.

The ARA-02 septic tank soils were retained for quantitative risk assessment in the comprehensive BRA to evaluate the risk from arsenic, Ra-226, Sr-90, U-234, and U-235 detected in the septic tank soils (DOE-ID 1999).

H1-6.1.5 ARA-03 (Lead Sheeting Pad Near ARA-627)

The ARA-03 site is a contaminated soil area located east of ARA-I building ARA-627. The area was identified as contaminated in 1979 during a routine radiation survey. The source of the contamination in uncertain, but may have originated either from a tank truck parked at the facility or from cleanup operations following the 1961 reactor accident at Stationary Low-Power Reactor No. 1 (SL-1). Lead sheeting was placed over the site for shielding. The sheeting was removed in 1991, and the site was assessed in a Track 2 investigation. Risks were identified from direct exposure to Cs-137 at unacceptable levels.

Soil was removed as part of the D&D of ARA-I to a depth of 1.1 m (3.5 ft) in a 7.6 × 7.9-m (25 × 26-ft) area. The approximate total volume of 66 m^3 (84 yd^3) was disposed of at the Radioactive Waste Management Complex (RWMC). Post-removal sampling and analyses were conducted to determine residual concentrations of Cs-137, other gamma-emitting radionuclides, and selected heavy metals. Cs-137 was the only detected radionuclide. Concentrations ranging from 0.49 to 7.4 pCi/g were detected in the five locations sampled and averaged 2.9 pCi/g. The background level defined for Cs-137 grab samples is 1.28 pCi/g. Concentrations of arsenic ranged from 6.2 to 9.1 mg/kg and averaged 7.8 mg/kg. Compared to the arsenic Sitewide background value for grab samples of 7.4 mg/kg g (Rood, et al. Harris, and White 1996), the samples from four of five sample locations yielded slightly higher concentrations. Local background concentrations for ARA and PBF are as high as 8.3 and 38.7 mg/kg, respectively. Therefore, detected concentrations are consistent with the local WAG 5 background for arsenic. Concentrations of all other heavy metals were below background values. The contaminated soils were packaged in 56 boxes and transported to the RWMC. The site was backfilled and graded with clean soil to a depth of 0.9 m (3 ft) and seeded with grass. No sampling data gaps were identified in the WAG 5 Work Plan (DOE-ID 1997). The ARA-03 site was retained for quantitative risk assessment in the WAG 5 comprehensive RI/BRA to evaluate the risk potential from Cs-137 (DOE-ID 1999).